

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Remarkable Case of Congenital Absence of Sternum; the Movements of the Heart Visible.*—An instance of congenital fissure, or the absence of the sternum, in a young man, a foreigner, excited very considerable attention this week at Guy's Hospital. We have seldom, if ever, seen a case of such intense interest, in a physiological point of view, as connected with the very vexed question of the sounds of the heart. The region of the sternum, in this individual, is, in fact, quite open, and displays under the skin the particular movements of the pericardium and heart. This fault of conformation interferes rather singularly with the actions usually ascribed to the sterno-hyoid and sterno-thyroid muscles, which are entirely absent at the right side, and very imperfectly developed at the left. The sterno-cleido-mastoid muscles, curiously enough, in their movements, extensively influence the neck, without a trace of sternal attachment; and in fact, when forced inspiration is tried, it is quite remarkable how the chest is expanded by these muscles, and the trapezius at each side, the diaphragm and the heart not seeming to be much affected, while the lungs, or what may be conceived to be a mass of pleura, mediastinum, and lung, being forced out, fills up the front of the neck. The man is now twenty-five years of age, and enjoys apparently good health. He has been examined by Skoda, Rokitansky, Bouillaud, Bernard, Piorry, Malgaigne, and some others on the continent, and has excited no ordinary speculation as to the sounds of the heart. He has been at Guy's Hospital, under the observation of Dr. Wilks, Dr. Parry, Dr. Addison; at St. Thomas's Hospital under that of Mr. Simon, Dr. Peacock, &c.; at King's College Hospital under that of Dr. Todd, &c. We have been particularly struck, at a hasty glance of the case, by the beautiful vermicular movement of the heart, by which the right auricle is filled with blood; for it does not appear to be the aorta which is under the skin, as at first suspected, but an oblong tumour covered with pericardium, the pulsations of which are not exactly synchronous with the pulse at the wrist, though it requires considerable care to detect the difference—more especially if the young man, the subject of the malformation, is tired by too much examination of the parts. This oblong tumour is most probably the right auricle, dilating and contracting, in a peculiar vermicular way, sixty or seventy times in a minute, and being about the size of two large thumbs of an adult, but made once and a half as large by the young man "holding his breath," and thus allowing the auricle to be engorged. The diastole and systole are alternate, but not of that steam-engine piston character, up and down, as is usually thought; the period of the dilatation is longer than that of the contraction of the tumour or auricle; the dilatation is, however, rapid, with an

apparent tilt of the heart forward, immediately followed by a peculiar vermicular collapse, or emptying of the tumour, impeded only by "holding the breath," or offering an obstacle to the blood going to the lungs. These various points are clear, and what, theoretically, might be expected. Not so, however, the relation of the *sounds* of the heart to the movements of systole and diastole; on which it is curious to perceive (looking through the note-book the young man takes with him) that all the first observers in Europe seem to have had peculiar and not very harmonizing opinions, from those offered by Rokitsansky, Skoda, Bouillaud, Hamernik, Beclard, &c., down to the plessimetric crudities of Piorry, and the fancies of some American friends. The *second* sound is, perhaps, more marked than the first. It is difficult to arrive at any certainty on this and other points, however, as at Guy's Hospital, on Tuesday last, every pupil in the theatre seemed anxious about some one other particular point, no little confusion necessarily ensuing. The two sounds are about equal in duration and force, but passing obliquely towards the base of the heart. The second sound (shall we call it valvular?) is more marked over the pulmonary artery, and to the ear even more superficial than that of the aorta. There did not seem to us any doubt that the impulse of the heart or tumour coincided exactly, not with the pulse at the wrist, as a ventricular phenomenon, but rather with the emptying of the subcutaneous tumour or auricle. We thought we could detect the systole of the right ventricle, agreeing with the phenomena of the opposite ventricle and pulse; a very appreciable interval, it must be remembered, existing between the latter and the exposed right *auricle*.

The movement of the tumour is very marked, as already stated, especially on forced expiration, or "holding the breath." It (the tumour) sometimes appears fluttering or incomplete in its contractions or movements, pointing still further to its auricular character. The shock or impulse, so much a matter of controversy at the British Association and elsewhere, would appear to arise from the diastole of the ventricle, and not the systole, as usually believed. The second sound of the heart is, however, not so well cleared up by the case as the first sound. The second sound is now universally considered to be caused by the *click* of the valves, as suggested to us by Dr. Sieveking, who also examined the case this week. This fact is arrived at, of course, from pathological indications. It will be found interesting to confine the observations made on this young man (E. A. Graux) as much as possible to the *first* sound, due so much to the impulse or shock of the heart, and synchronous contraction of both ventricles.—*Lancet*, June 23, 1855.

[We subjoin some further particulars of this very interesting and remarkable case from the *Gazette des Hôpitaux*, the patient having visited Paris, and been examined by the physiologists of that capital. The man proposes, we learn, to shortly come to this country to exhibit himself here.]

Alexander Graux, 25 years of age, presented himself before M. ARAN, exhibiting a malformation of the sternum, consisting in an almost entire division of that bone along its mesial line.

In the whole of the region naturally occupied by the sternum there existed a depression or gutter-like cleft, its walls formed by the integument only. This depression was about three and a half inches in length, measuring it vertically from a line drawn from one clavicle to the other, and assumed a triangular shape, the base above in the space between the two clavicles, and the apex below. At its base it measured about two-thirds of an inch, and at its apex about an eighth. The dimensions of this furrow could be considerably increased at the pleasure of the patient by putting his pectoral muscles into strong action, the integument covering it being then stretched so as to occupy the same level as the rest of the wall of the thorax, the depression being entirely effaced.

When in a state of repose, an osseous rim, evidently formed by the two halves of the sternum, was distinctly seen on either side of the cleft, and to this the ribs were connected in the usual manner. This malformation entailed some considerable modification in the relations of the osseous and muscular structures of the neck and chest. The clavicles, natural in their curve and structure, terminate in a large extremity above either half of the sternum, without any trace of a sterno-clavicular articulation. The sterno-cleido mastoid mus-

cles arise from the clavicle only; properly speaking they are cleido-mastoid, the right sterno-hyoid and thyroid are absent, but on the left side they can be seen, during a deep inspiration, resembling two prominent cords. The respiratory functions are no less considerably modified by this malformation. An ordinary inspiration is at once diaphragmatic and superior costal, with this peculiarity, that the diaphragm acts first, the upper ribs rising after the commencement of the recoil of the abdominal walls. During a deep inspiration the chest is raised and enlarged by the trapezius and sterno-mastoid on either side, while there is no proportionate increase in the action of the diaphragm and upper ribs. There is nothing remarkable in an ordinary inspiration, but during a forced one the chest and the abdomen retract, the veins of the neck become conspicuous, some of the intercostal spaces become convex on the outer surface, and then the fissure commences to rise from its middle upwards until the integument becomes level with, or even projects beyond the level of the neighbouring structures.

Owing to this malformation, the mode of performing some of the functions of the heart can be studied through the thin covering of integument. About the middle of the fissure an oblong tumour alternately dilates and contracts from sixty to sixty-four times in the minute. When most dilated, the tumour is about two inches in its greatest or vertical diameter, and it diminishes from one-half to two-thirds when contracting from above downwards; and from the right to the left side, the dilating and the contracting alternate, and the former occupies rather more time than the latter. This pulsating tumour is relatively less resonant on percussion than the neighbouring parts, and this dullness is continuous with that of the ventricles, or of the heart properly so called, measuring three inches from side to side, reckoning from the mesial line, and three and a half from above downwards. At the level of the tumour the two sounds of the heart are very loud and clear, especially the second. At the boundary of the ventricular dullness, which extends beyond the level of the impulse, the two are equally loud, clear, and nearly of the same duration; but ascending obliquely towards the base, the second sound becomes stronger and clearer, and near the sternum the first acquires a blowing character. The second sound derived from the pulmonary artery is more distinct and superficial than that of the aorta. When the hand is placed upon the spot at which the impulse is most distinctly felt, viz: in the fourth intercostal space close to the nipple, when the patient is lying down, or a little below the fifth rib if he is standing, this impulse is found exactly to coincide with the commencement of the contraction of the tumour. If the fingers are placed on the radial or the carotid while the eye attentively watches the movements of the subcutaneous tumour, an appreciable interval is noticed between its contraction and the dilating of the artery, the latter being always consecutive.

Such are the principal peculiarities presented by this malformation. The young man enjoys excellent health, though of a feeble appearance. For the present we record the phenomenon without seeking to deduce from it any argument in reference to the many different theories respecting the movements of the heart, and we abstain from bringing forward the diverse explanations which have been already offered.

A commission composed of MM. Aran, Beau, Béheir, Bouvier, Hérard, and Monneret, has been requested to report upon the subject to the Medical Society of the Hospitals.

2. *Production of Sugar illustrated by Pathological Facts.*—In a memoir recently read at the Imperial Academy of Sciences, M. ANDRAL furnishes an account of some observations he has had occasion to make on diabetic patients. First, as to the effect of a deprivation of food. When a diabetic patient has ceased, from any cause, to take food, M. Andral has found the sugar of the urine diminish or disappear. Thus, a woman whose urine furnished from 40 to 70 grammes of sugar per litre, lost her appetite, and at last took no food at all. The sugar kept diminishing under a diminished diet, from 54 to 28 grammes per litre, and 43 hours after abstinence not an atom of sugar could be detected.

Only three days after a gradual return to food did the sugar again begin to show itself (20 grammes per litre), but after then it rapidly regained its old proportion.

Next, in the absence of these aliments which chemistry can transform into saccharine matter, can sugar be produced in the organism from exclusively albuminous aliment? M. Bernard declares that he has found sugar in the liver and hepatic veins of dogs kept exclusively on meat, and clinical observations confirm his statement. Although by the abstraction of all saccharine and amylaceous food we may temporarily diminish the quantity of sugar in the urine, we cannot, in the immense majority of cases, reduce it to zero, or, at all events, can only do so temporarily. Nay, even under an exclusively animal regimen we may see it continually increase. A woman rigorously kept to an exclusively meat regimen for two months, without ever missing a day, taking for drink water, to which a little alcohol was added; at the end of this period, being no better, and disgusted with her food, she abandoned the trial. When she commenced this regimen, the urine furnished 27 grammes of sugar per litre, and at first the proportion diminished to 20, 15, 12, and 10 litres. Then, quite suddenly, without any change in the regimen, it mounted up from 10 to 20, 30, 44, and 49 grammes. When the animal regimen was combined with eggs, milk, and a little bread and vegetables, and some wine and water, it was found, contrary to all expectation, that the sugar again descended to 30, 26, and 15 grammes; but, in three weeks, had reached 54 grammes. Thus, the important conclusion is deducible from this patient's case, that all sudden changes of diet, even of an opposite kind, are attended by a temporary diminution of the sugar, to be followed by an increase. M. Andral has met with several similar cases. Not long since, he had a patient whose urine, while he was on exclusive animal diet, furnished 82 grammes per litre; and as he passed 8 litres of urine in the twenty-four hours, he excreted in that time 656 grammes.

If, as is deducible from Bernard's experiments, the blood which comes from the liver charged with sugar contains this no longer when it has traversed the lungs, does the sugar found in the diabetic arise from the formation of an excessive quantity by a diseased liver, which escapes the action of the lungs, or has this latter organ undergone such alteration as allows the sugar reaching it in the hepatic blood passing intact? We do not, however, observe in the lungs of the diabetic any special alteration. The tubercles so commonly found in them cannot be so regarded, as sugar is not usually found in the urine in phthisis; while the statement made by Reynoso, that sugar is found in the urine whenever the respiration is embarrassed, requires confirmation. Nor do we habitually find sugar in the urine of individuals attacked with any of the diseases of the liver we are acquainted with. But while the lungs of the diabetic do not present anything special, this is not the case with regard to the liver. Since the publication of Bernard's researches, M. Andral has made five autopsies in diabetic patients, and the liver in all has presented similar alterations, viz: a deep brownish-red colour, so that the entire organ, in place of presenting the yellow and red substances of the normal state, exhibited a perfectly uniform red colour. There were all the anatomical characteristics of a very intense hyperæmia, presenting a very different appearance to the hyperæmia that, under the influence of very different causes, are so easily produced in this organ. The constancy of this complete engorgement of the liver is a proof of its importance; and if the organ secretes sugar, it is logical to admit that this hepatic hyperæmia is the anatomical sign of the increased activity in the glucogenic function. It must not be said that the azotized and substantial food given to these patients is the cause of the hyperæmia, for in two of the cases alimentation was nearly as in ordinary. But as every hepatic congestion is not attended by the increased production of sugar, the most common effect of such being to diffuse the elements of the bile through all parts of the organism, we may, perhaps, find the explanation of this fact in the difference of the seat of the congestion. Is it not, in fact, possible that, accordingly as this or that anatomical element, or order of capillary vessels, is more specially congested, sometimes a change in the secretion of bile, sometimes in that of sugar, some-